SOIL SURVEYS IN BRIEF

About one-half of the land in farms in the United States has been covered by soil surveys that show enough detail for conservation planning. This is about one-third of the total land area of the United States.

The present rate of soil mapping is about 50 million acres a year. This is done by about 1,200 soil scientists in the field. About 200 additional soil scientists work as supervisors and on correlation, soil research, and publication of soil maps and reports.

WHAT ARE SOIL SURVEYS?

What are soil surveys? To put it simply, a soil survey is an inventory of soil resources in a given area. A soil survey tells us the kinds of soils and their characteristics. It tells us how the soils are distributed and where they came from and how they behave.

In a soil survey we find the important properties of soils. We classify the soils into defined units. We locate and plot the boundaries of the soil units on maps. Finally, we publish this information in a soil-survey report. A soil-survey report includes a map that shows the location and extent of the soils in the area. It includes descriptions of the soils and how they can be used and managed. It gives the limitations and the potentialities of the soils. Soil-survey reports usually cover one county.

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Soils differ greatly in their physical, chemical, and biological composition. You don't have to be an expert to see differences in soils and their effect on water movement and plant growth. You've seen shallow stony soils, sandy soils, wet clay soils, badly eroded soils, and deep productive soils. And you've noticed differences in the kinds and amounts of vegetation they produce.

Some soils look alike on the surface but are quite different just below the surface. The differences may be in their composition or in the arrangement of the soil layers. Through research and experience we know there is a close relationship between different kinds of soil and their soil and water management problems and their production potentials.

We classify and name soils just as we do plants, animals, and rocks. We identify soils by certain characteristics such as the kinds and numbers of layers that have developed in them. The relative amounts of stones, gravel, sand, silt, and clay, and the kinds of minerals present help distinguish the layers. We name soils after the towns or localities near the place where the soils were first defined.

Soil surveys are made cooperatively by the Federal and State Governments. The Soil Conservation Service is the Federal agency that has primary responsibility for soil surveys. The land-grant colleges and universities, primarily State agricultural experiment stations, are the State agencies.

HOW ARE SOIL SURVEYS MADE?

Soil surveys are made by soil scientists who examine the soils field by field and record their findings on aerial photographs. The recorded findings of the soil scientist is called a soil map.

Soil scientists use their knowledge of the relation of landscape features, climate, geological material, relief, and vegetation in predicting the kinds of soil they expect to find. They dig numerous holes and examine the different layers of soil. They determine the total thickness of the soil and the thickness of each layer. They study the properties of each layer. They examine the size of soil particles, the arrangement of soil particles, the color of the soil, and the acidity or alkalinity in each layer. They study other characteristics, especially those having to do with soil behavior and productivity.

They measure slope or gradient of the soil. They record stoniness, losses of soil by erosion, salt accumulation, and evidences of poor drainage. Soils that do not have differences that are significant in soil use and soil genesis are placed together and given a symbol for the map, and the boundaries are outlined on the map. Soil maps made by the soil scientist in the field include boundaries of different kinds of soil and other important land features.

Additional information shown on the map include the location of natural drains and of rock outcrops, lakes, ponds, levees, railroads, roads, powerlines, and buildings.

The notes taken by the soil scientist during the soil survey are used for reference as the soil survey is made. As soon as the work in an area is well underway all notes and information are assembled into handbooks and technical guides that are used in farm conservation planning. Each farmer or rancher cooperator in a soil conservation district is given a copy of the soil map of his farm as a part of his soil and water conservation plan.

When the field mapping for an area is finished the soils information is transferred from the field sheets to a photomosaic base and printed as a soil map. The photomosaic shows such details as natural drainage, field boundaries, broad land use patterns, and roads and trails.

HOW ARE SOIL SURVEYS USED?

Soil surveys have many uses. One of the main uses is in applying the results of research and experience to individual fields or parts of fields. Using soil maps, results from an experience on a given soil can be applied directly to other areas of the same kind of soil with confidence.

Farmers use soil surveys to learn the extent and location of the different kinds of soil they have, the ability of these soils to grow plants, and their response to use and management. For example, some soils must be drained before they can be used for crops. Others must be irrigated. Sloping soils need to be protected from erosion when clean-tilled crops are grown.

Most users of soil surveys want more general information than that of the individual mapping unit. They like to have grouped together, for example, soils that behave alike when used and treated alike. Such groupings result in wider and more efficient use of what is known about soils.

The land-capability classification is one interpretive grouping. In this classification soils are grouped according to (1) their adaptability for farm crops under permanent agriculture; (2) what they can be expected to do; (3) their limitations for sustained production; and (4) the risk of soil damage if they are mismanaged.

The land-capability classification is used as a guide to soil and water conservation planning on farms and ranches.

Soils are also grouped for special crops--for example, blueberries and cranberries--and into range sites, and for woodland suitability.

Here are some other ways in which soil surveys are used.

Land appraisers use soil surveys as a source of information on which to base land values.

County and community planning officials use soil surveys to locate the areas most productive for agricultural products that may be needed in the future and to locate areas less desirable for agriculture but suitable for housing, schools, shopping centers, parking lots, and industry.

Conservation engineers use soil surveys to find out how fast water will enter a soil and how fast water passes through the soil. They use such information to lay out terraces and irrigation and drainage systems and to determine the size of dams needed to retard floods.

Soil surveys are used for evaluating wildlife habitat, for locating and building ponds for waterfowl, and in locating recreation, hunting, and fishing sites.

Investors, bankers, insurance companies, and loan companies find soil surveys helpful in determining the soundness of proposed investments in land. Land purchasers use soil surveys to look at the soil and its potential productivity.

Manufacturers of earthmoving equipment use soils information in the design of certain types of machinery.

Organizations such as soil conservation districts, watershed conservancy districts, and drainage districts use soils information in developing district programs.

Research workers use soils information to set up crop and fertilizer studies. Extension workers and teachers use soil maps to help inform farmers and students about soils and on how to do a better job of farming using soils information.
